

REMARKS

Claims 1, 3, 8, 11 and 13 have been amended in order to more particularly point out, and distinctly claim the subject matter to which the applicant regards as his invention. The applicant respectfully submits that no new matter has been added. It is believed that this Response is fully responsive to the Office Action dated August 13, 2002.

Claim 8 has been objected to for the specific reasons set forth in item 2, page 2 of the outstanding Action. The applicant respectfully request reconsideration of this objection.

Claim 8 has been amended in order to correct certain informalities therein, including those pointed out by the Examiner.

Accordingly, the withdrawal of the outstanding objection to claim 8 is in order, and is therefore respectfully solicited.

Claims 3 and 13 stand rejected under 35 USC §112, second paragraph, for the specific reasons set forth in item 4, page 2 of the outstanding Action. The applicant respectfully requests reconsideration of this rejection.

As indicated above, claims 3 and 13 have been amended in order to more particularly point out, and distinctly claim the subject matter to which the applicant regards as his invention, and in order to correct certain informalities therein, including those which have been pointed out by the Examiner.

Specifically, each of claims 3 and 13 has been amended so as to be in independent form without the recitation of the step of "introducing said reductive nitrogen-containing gas" (in claim 3) or the step of "introducing said NH_3 gas" (in claim 13). In this manner, the antecedent issue raised by the Examiner is avoided, and any possible objection of negative claiming with the claim term "without" is further avoided.

Accordingly, the withdrawal of the outstanding indefiniteness rejection under 35 USC §112, second paragraph, is in order, and is therefore respectfully solicited.

As to the merits of this case, the following rejections are set forth:

- (1) claims 1 - 5 and 8 stand rejected under 35 USC §102(b) as being anticipated by Lu (of record);
- (2) claims 11 - 16 stand rejected under 35 USC §103(a) based on Lu; and
- (3) claims 6, 7 and 17 stand rejected under 35 USC §103(a) based on Lu in view of Akahori (also of record).

The applicant respectfully requests reconsideration of these rejections.

As discussed in the last Amendment filed for this case, Lu teaches plasma enhanced chemical vapor deposition (PECVD). The applicant's instant claimed invention, on the other hand, discloses a process by heat CVD method.¹

A more detailed discussion of the difference between Lu's plasma enhanced chemical vapor deposition (PECVD), and the applicants' claimed heat CVD method can be found on the second full paragraph on page 10 of the last Amendment. The Lu and Akahori references are directed to the plasma CVD process types, but the applicant's claimed invention is directed to a heat CVD method.

In response, the Examiner has now taken the position that:

in response to applicant's arguments, the recitation "by the heat CVD method" has not been given patentable weight because the recitation occurs in the preamble.²

Based on the Examiner's not having given "patentable weight" to the use of heat CVD method in the applicant's claimed process for producing the barrier film, and based on the discussions of the use of the CVD apparatus 50 (illustrated in the applicant's Figure 4) in, e.g., lines 10 - 20, page 14 of the applicant's specification, the applicant has amended each of independent claims 1, 8 and 11

¹ See, the fourth full paragraph on page 9 of the Amendment filed on May 30, 2002.

² See, lines 6 - 8, item 12, page 5 of the outstanding Action.

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so as to more particularly recite the various method steps, used in the CVD apparatus; thereby highlighting such various method steps in the bodies (rather than in the preambles) of the above-discussed claims.

Also, because claims 3 and 13 have been re-written in independent form, the applicant has also amended such claims 3 and 13 similar to the manner discussed above with respect to independent claims 1, 8 and 11.

Based on the above and the amended claims submitted herewith, the applicant respectfully submits that the applicant's claimed invention is not anticipated by Lu under 35 USC §102(b). Similarly, based on the applicant's above remarks and the amended claims submitted herewith, a person of ordinary skill in the art would not have found the applicant's claimed invention obvious under 35 USC §103(a) based on Lu, singly or in combination with Akahori.

Accordingly, the withdrawal of the outstanding rejections under 35 USC §102(b) and 103(a) is in order, and is therefore respectfully solicited.

In view of the aforementioned amendments and accompanying remarks, claims, as amended, are in condition for allowance, which action, at an early date, is requested.

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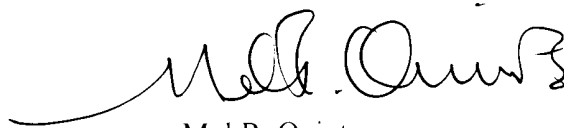
If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact the applicant's undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "**Version with markings to show changes made.**"

In the event that this paper is not timely filed, the applicant respectfully petitions for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

ARMSTRONG, WESTERMAN & HATTORI, LLP



Mel R. Quintos
Attorney for Applicant
Reg. No. 31.898

MRQ/lrj/ipc

Atty. Docket No. **000155**
Suite 1000, 1725 K Street, N.W.
Washington, D.C. 20006
(202) 659-2930



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PATENT TRADEMARK OFFICE

Enclosures: Version with markings to show changes made
H. BOMI- MEL TRANSFER 000155 RESPONSE 116 due BEFORE 1-13-03 filed 1-8-03

IN THE CLAIMS:

Amend claims 1, 3, 8, 11 and 13 as follows:

1. (Twice Amended) A process for producing a barrier film by a heat CVD method which comprises the steps of:

providing a substrate on a substrate holder in a vacuum atmosphere within a CVD apparatus;

heating said substrate at a temperature range;

introducing a feedstock gas having a high temperature-melting point metal in its structure, and a reductive nitrogen-containing gas comprising a nitrogen atom into said vacuum atmosphere; and

forming a film of the nitride of said high temperature-melting point metal on said substrate,

wherein a nitrogen-free auxiliary reductive gas is introduced into said vacuum atmosphere.

3. (Twice Amended) The process for producing a barrier film by the heat CVD method [according to claim 2, which further comprises a step of], comprising the steps of:

providing a substrate on a substrate holder in a vacuum atmosphere within a CVD apparatus;

heating said substrate at a temperature range;
introducing a feedstock gas having a high temperature-melting point metal in its structure
into said vacuum atmosphere; and
forming a film of the nitride of said high temperature-melting point metal on said
substrate.

wherein a nitrogen-free auxiliary reductive gas is introduced into said vacuum
atmosphere, said nitrogen-free auxiliary reductive gas being introduced together with said
feedstock gas into said vacuum atmosphere [introducing said feedstock gas and said auxiliary gas
into said vacuum atmosphere without introducing said reductive nitrogen-containing gas].

8. (Twice Amended) A process for producing a barrier film by [the] a heat CVD method
for forming a barrier film made of a film of the nitride of a high temperature-melting point metal
on a substrate on a substrate holder in a vacuum atmosphere within a CVD apparatus, [wherein]
comprising the steps of exposing the surface of said substrate [is exposed] to a plasma of
hydrogen gas and a plasma containing at least one gas selected from among argon, nitrogen and
helium gases[,]; and then forming the film of the nitride of said high temperature-melting point
metal [is formed] on the surface of the substrate, wherein the step of forming the film includes
the steps of heating the substrate at a temperature range.

11. (Amended) A process for producing a barrier film which comprises the steps of:
providing a substrate on a substrate holder in a vacuum atmosphere within a CVD

apparatus;

heating said substrate at a temperature range;

introducing a feedstock gas having a high temperature-melting point metal in its structure,
and a NH_3 gas into said vacuum atmosphere; and

forming a film of the nitride of said high temperature-melting point metal on said
substrate,

wherein a reductive Si-containing gas is introduced into said vacuum atmosphere.

13. (Amended) The process for producing a barrier film [according to claim 12, which
further comprises a step of], comprising the steps of:

providing a substrate on a substrate holder in a vacuum atmosphere within a CVD

apparatus;

heating said substrate at a temperature range;

introducing a feedstock gas having a high temperature-melting point metal in its structure
into said vacuum atmosphere; and

forming a film of the nitride of said high temperature-melting point metal on said
substrate,

wherein a reductive Si-containing gas is introduced into said vacuum atmosphere, said
reductive Si-containing gas being introduced together with said feedstock gas into said vacuum
atmosphere [introducing said feedstock gas and said reductive Si-containing gas into said
vacuum atmosphere without introducing said NH_3 gas].